IN THE CLAIMS:

Claims 1-29. (Canceled)

Claim 30. (Previously presented) An integrated lab-on-a-chip diagnostic system for carrying out a sample preparation process on a fluid sample containing cells and/or particles, the system comprising the following components formed on a common substrate:

(a) an inlet for a fluid sample;

(b) a lysis unit for lysis of cells and/or particles contained in the fluid sample;

(c) a nucleic acid extraction unit for extraction of nucleic acids from the cells and/or particles contained in the fluid sample;

(d) a reservoir containing a lysis fluid;

(e) a reservoir containing an eluent for removing nucleic acids collected in the nucleic acid extraction unit;

wherein the sample inlet is in fluid communication with the lysis unit, and there is optionally a valve to control the flow of fluid therebetween;

wherein the lysis unit is in fluid communication with the nucleic acid extraction unit, and there is optionally a valve to control the flow of fluid therebetween;

wherein the reservoir containing the lysis fluid is in fluid communication with the lysis unit, and there is a valve to control the flow of fluid therebetween;

wherein the reservoir containing the eluent is in fluid communication with the nucleic acid extraction unit, and there is a valve to control the flow of fluid therebetween, and

wherein the system further comprises a single pump or syringe for actuation of all liquids.

Claim 31. (Previously presented) A system as claimed in claim 30, further comprising (g) a nucleic acid reaction unit, wherein the nucleic acid extraction unit is in

fluid communication with the nucleic acid reaction unit, and there is optionally a valve to control the flow of fluid therebetween.

Claim 32. (Previously presented) A system as claimed in claim 30, further comprising (h) a waste unit, wherein the waste unit is in fluid communication with the lysis unit, and there is optionally a valve to control the flow of fluid therebetween.

Claim 33. (Previously presented) A system as claimed claim 30, further comprising (i) a reservoir containing a washing solvent, which reservoir is in fluid communication with the nucleic acid extraction unit, and there is optionally a valve to control the flow of fluid therebetween.

Claim 34. (Previously presented) A system as claimed in claim 33, further comprising (j) a reservoir containing a further washing solvent, which reservoir is in fluid communication with the nucleic acid extraction unit, and there is optionally a valve to control the flow of fluid therebetween.

Claim 35. (Previously presented) A system as claimed in claim 34, wherein the reservoir containing the eluent is in fluid communication with the reservoir containing the first washing solvent and/or the reservoir containing the second washing solvent.

Claim 36. (Previously presented) A system as claimed in claim 35, wherein the eluent, the first washing solvent and/or the second washing solvent are contained in a common reservoir.

Claim 37. (Previously presented) A system as claimed in claim 36, wherein the eluent, the first washing solvent and/or the second washing solvent are separated from one another in the common reservoir by a fluid.

Claim 38. (Previously presented) A system as claimed in claim 36, wherein the common reservoir comprises a conduit in fluid communication with the inlet and the lysis unit.

Claim 39. (Previously presented) A system as claimed in claim 30, further comprising a filtration unit, which unit is in fluid communication with the lysis unit.

Claim 40. (Previously presented) A system as claimed in claim 39, wherein the filtration unit comprises one or more of a dead-end filter, a cross-flow filter, a gravity settler, a centrifuge, an acoustic cell filter, an optical trap, dielectrophoresis (DEP), electrophoresis, flow cytometry and adsorption based methods.

Claim 41. (Previously presented) A system as claimed in claim 30, wherein the lysis unit further comprises a filter to filter the fluid sample.

Claim 42. (Previously presented) A system as claimed in claim 41, wherein said filter comprises one or more of a dead-end filter, a cross-flow filter, a gravity settler, a centrifuge, an acoustic cell filter, an optical trap, dielectrophoresis (DEP), electrophoresis, flow cytometry and adsorption based methods.

Claim 43. (Previously presented) A system as claimed in claim 30, wherein the system further comprises a heater for heating the contents of the lysis unit and/or the nucleic acid extraction unit.

Claim 44. (Previously presented) A system as claimed in claim 43, wherein said heater comprises one or more Peltier elements located in or adjacent the lysis unit and/or the nucleic acid extraction unit.

Claim 45. (Previously presented) A system as claimed in claim 30, wherein the nucleic acid extraction unit is at least partially filled with silica beads or particles.

Claim 46. (Previously presented) A system as claimed in claim 45, wherein the nucleic acid extraction unit further comprises one or more sets of electrodes adjacent the silica beads or particles for collecting and/or preconcentrating the eluted nucleic acids.

Claim 47. (Previously presented) A system as claimed in claim 46, wherein said one or more sets of electrodes comprises platinum electrodes.

Claim 48. (Previously presented) A system as claimed in claim 30, for extracting nucleic acids present in a biological fluid, a dairy product, an environmental fluid, or drinking water.

Claim 49. (Previously presented) An apparatus for the analysis of biological and/or environmental samples, the apparatus comprising a system as defined in claim 30.

Claim 50. (Previously presented) An assay kit for the analysis of biological and/or environmental samples, the kit comprising a system as defined in claim 30 and means for contacting the sample with the system.

Claim 51. (Previously presented) An apparatus as claimed in claim 30 which is disposable.

Claim 52-58. (Canceled)

Claim 59. (Previously presented) The diagnostic system of claim 30 wherein:

the reservoir containing the eluent is in fluid communication with the inlet, and there is optionally a valve to control the flow of fluid therebetween.

Claim 60. (Previously presented) The diagnostic system of claim 30 wherein:

the reservoir containing the lysis fluid is in fluid communication with the inlet, and there is optionally a valve to control the flow of fluid therebetween.

Claim 61. (Previously presented) The diagnostic system of claim 30 wherein:

the reservoir containing the lysis fluid is in fluid communication with the inlet, and there is optionally a valve to control the flow of fluid therebetween; and

the reservoir containing the eluent is in fluid communication with the inlet, and there is optionally a valve to control the flow of fluid therebetween.